



## Single-Atom Catalysts of Platinum for Electrochemical Reactions: Activity, Selectivity, and Support Effect

Yang, Sungeun; Kim, Ji-Hwan ; Lee, Hyunjoo

*Published in:*  
Book of Abstracts Sustain 2017

*Publication date:*  
2017

*Document Version*  
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*  
Yang, S., Kim, J-H., & Lee, H. (2017). Single-Atom Catalysts of Platinum for Electrochemical Reactions: Activity, Selectivity, and Support Effect. In *Book of Abstracts Sustain 2017* [C-2]

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

## Single-Atom Catalysts of Platinum for Electrochemical Reactions: Activity, Selectivity, and Support Effect

Sungeun Yang,<sup>1,2,\*</sup> Ji-Hwan Kim,<sup>2</sup> Hyunjoo Lee<sup>2</sup>

1: Department of Physics, Technical University of Denmark (DTU), Kongens Lyngby, Denmark

2: Department of Chemical and Biomolecular Engineering, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Republic of Korea

\*sungya@fysik.dtu.dk

Single-atom catalysts are atomically dispersed metal atoms anchored on the support surface. Single-atom catalysts exhibit intriguing catalytic properties due to its surface structure that active atoms are well separated with each other, and each individual atoms interact with support atoms. Herein, we show different types of Pt single-atom catalysts using different support materials: gold nanoparticles, titanium nitride, titanium carbide, and antimony doped tin oxide. Pt single-atom catalysts exhibited several interesting features in electrochemical reactions. Near hundred percent metal utilization of Pt led to high mass activities in electrochemical reactions. Absence of ensemble site, atomically dispersed active sites, was responsible for controlling the reaction pathways. Support effect was much more pronounced in single-atom catalysts due to stronger interaction between single-atom and support atoms. Still in their early development, single-atom electrocatalysts will open new opportunities in various electrochemical reactions for future energy applications.